

## **DRONE TECHNOLOGIES 2**

### **ACTIVITY COURSE CODE: 57T2**

**COURSE DESCRIPTION:** In Drone Technologies 2 course, students will design, document, and understand the safety involved of drones, airframes, electric motors, propellers, electronics speed controllers, batteries, charges and connectors, transmitters, and receivers, as well as the use of cameras, gimbals, ground control stations, regulations, and the FAA.

**OBJECTIVE:** Given the necessary equipment, materials, and instruction, students, on completion of the prescribed course of study, will be able successfully accomplish the following core competencies.

<b>COURSE CREDIT:</b>	1 (120 hours) credit
<b>PRE-REQUISITE</b>	Drone Technologies 1
<b>RESOURCES:</b>	See Materials and Resources
<b>COMPUTER ACCESS:</b>	1 computer per student
<b>MAXIMUM ENROLLMENT:</b>	16 per instructor

#### **A. THE FAA PART 107 LICENSE**

**Drone Technology students demonstrate appropriate knowledge and skills to prepare safely operate an Unmanned Aircraft System (UAS). The following accountability criteria are considered essential for students in preparing for the pre-professional Drone Technology program of study.**

1. Define engineering.
2. Identify the engineering design process.
3. Analyze the seven-step design process.
4. Define the importance of documentation.
5. Analyze effective team practices.
6. Identify how to use an engineering notebook.
7. Identify software options for the designing phase.
8. Analyze hand tool options for the building phase.
9. Assess knowledge regarding design and documentation.
10. Identify how to fly a drone responsibly.
11. Evaluate how to establish a safety culture.
12. Identify workshop safety rules and issues.
13. Analyze soldering safety rules.
14. Identify how to increase drone knowledge.
15. Analyze various flight safety organizations and their regulations.
16. Define and understand recreational drone use.
17. Define safety guidelines for sUAS recreational users.
18. Identify safe flying locations and no-fly zones.
19. Analyze how weather conditions can impact a drone's flight.
20. Analyze how propellers can be dangerous.

21. Define a pre-flight inspection.
22. Assess knowledge regarding safety considerations.
23. Define what a drone is.
24. Identify the history of a drone.
25. Identify the different types of drones.
26. Analyze how to choose a multicopter configuration.
27. Analyze the different components of a drone.
28. Define how each component is used.
29. Identify how hobby drone use has increased.
30. Analyze how drones are used for racing.
31. Analyze drone usage within the commercial industry.
32. Assess knowledge regarding introduction to drones.
33. Discuss airframe characteristics.
34. Explore the history of helicopter designs.
35. Explore early multirotor aircraft designs.
36. Discuss the individuals who developed early multirotor aircrafts.
37. Analyze advancements in control and design.
38. Discuss multicopter and multirotor configurations.
39. Summarize how to choose a multicopter configuration.
40. Explore the basics of building a multicopter configuration.
41. Identify the various airframe sizes.
42. Analyze the different materials which can be used to create an airframe.
43. Define tensile strength.
44. Assess knowledge regarding airframes.
45. Define electric motors and how they are used.
46. Understand the basic history of electric motors.
47. Analyze the individuals who impacted the history of electric motors.
48. Analyze the differences in alternating and direct current motors.
49. Understand the difference between brushed and brushless motors.
50. Define the classification of load capability.
51. Understand how to calculate motor ratings.
52. Analyze extra calculation terms.
53. Analyze how to choose the best motor for specific needs.
54. Determine a drone's weight.
55. Calculate thrust needs.
56. Understand how to choose a motor for a 450 mm quadcopter build.
57. Assess knowledge regarding electric motors.

*Shop and Personal Safety, Student Organizations, Technology Knowledge, Professional Knowledge, and personal qualities and employability skills are to be embedded through standard A.*

## **SHOP AND PERSONAL SAFETY**

**Drone Technology students know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.**

1. Review school safety policies and procedures.
2. Review classroom safety rules and procedures.

3. Review safety procedures for using equipment in the classroom/lab/field.
4. Identify major causes of work-related accidents in the trucking environment.
5. Demonstrate safety skills in a classroom/work environment

## **STUDENT ORGANIZATIONS**

**Drone Technology students know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.**

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

## **TECHNOLOGY KNOWLEDGE**

**Drone Technology students know the academic subject matter, including digital citizenship and the ethical use of technology as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.**

1. Demonstrate proficiency and skills associated with the use of technologies that are common in a specific occupation (e.g., keying speed).
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyberbullying, piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related copyright laws, fair use laws, and ethics pertaining downloading of images, photographs, documents, video, sounds, music, trademarks, Creative Commons, and other elements for personal use.
6. Describe ethical and legal practices safeguarding the confidentiality of business- and personal-related information.
7. Describe threats a laptop, tablet, computer, and/or network and methods of avoiding attacks.
8. Evaluate various solutions common hardware and software problems.

## **PERSONAL QUALITIES AND EMPLOYABILITY SKILLS**

**Drone Technology students know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.**

1. Demonstrate creativity and innovation.
2. Demonstrate critical thinking and problem-solving skills.
3. Demonstrate initiative and self-direction.
4. Demonstrate integrity.
5. Demonstrate work ethic.
6. Demonstrate conflict resolution skills.
7. Demonstrate listening and speaking skills.
8. Demonstrate respect for diversity.
9. Demonstrate customer service orientation.
10. Demonstrate teamwork.

## **PROFESSIONAL KNOWLEDGE**

**Drone Technology students know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in the Drone Technology program of study.**

1. Demonstrate global or “big picture” thinking.
2. Demonstrate career and life management skills and goal-making.
3. Demonstrate continuous learning and adaptability skills changing job requirements.
4. Demonstrate time and resource management skills.
5. Demonstrates information literacy skills.
6. Demonstrates information security skills.
7. Demonstrates information technology skills.
8. Demonstrates knowledge and use of job-specific tools and technologies.
9. Demonstrate job-specific mathematics skills.
10. Demonstrates professionalism in the workplace.
11. Demonstrates reading and writing skills.
12. Demonstrates workplace safety.